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(73) Proprietor: **HONDA GIKEN KOGYO KABUSHIKI KAISHA**
1-1, 2-chome Minami-Aoyama
Minato-ku Tokyo(JP)

(72) Inventor: **Takayuki, Shimazaki**
3-13-14, Narita-Higashi
Suginami-ku Tokyo(JP)

(74) Representative: **Leale, Robin George et al**
FRANK B. DEHN & CO. Imperial House 15-19 Kingsway
London WC2B 6UZ(GB)

Rank Xerox (UK) Business Services

Description

This invention relates to a safety helmet, for example for use by motorcyclists and others, and is particularly directed to the provision of such a helmet which can prevent the front hair of the user from being disheveled, or at least reduce that problem.

Safety helmets are well-known which comprise a shell made from rigid material, a liner made from padding material fitting inside the shell, and an interior pad for absorbing sweat and fitted inside the liner. Grooves may be provided for air to flow through the helmet interior in the forward and rearward directions.

Known helmets have the problem that a user's hair, particularly the front hair, is easily disheveled by wearing the helmet. This is because the forehead region is tightly received within the space defined by the liner, with the result that the hair is compressed and overheated.

FR-A-2553266 discloses a safety helmet having a shell and an internal structure therein, wherein the said internal structure is formed to define a front space to accommodate the user's front hair, and a rear space to accommodate the back of a user's head, both of which spaces are open to the atmosphere, and an air flow path in said intenal structure extending from the said front space to the said rear space.

The present invention is characterised in that the width of the said front space is greater than the width of the said air flow path.

As the front hair of the user will be received in the said space in use, compression of the hair by the helmet interior structure is reduced, and furthermore the space improves ventilation of the hair and thus reduces overheating thereof.

An embodiment of the invention will now be described by way of example and with reference to the accompanying drawings, in which:-

Figure 1 is a side elevation view;

Figure 2 is a vertical longitudinal cross-section;

Figure 3 is a transverse cross-section;

Figure 4 is a horizontal cross-section;

Figure 5 is a vertical longitudinal cross-section of a liner;

Figures 6 and 7 are detailed partial cross-sections; and

Figure 8 is a diagrammatic perspective view illustrating the flow of air through the helmet in use.

Referring first to Figure 1, a helmet according to the invention has a shell 1 made from rigid material and forming an outermost layer, a windshield 2 at the front thereof, ear covers 3 on both sides, and a chin strap 4 secured to the inside wall of the shell 1 by rivets 5.

Inside the shell 1 there is provided a liner 6 made from padding material such as styrol foam, as shown in Figures 2 to 4. The liner 6 has a first space 7 for receiving the user's head. A top pad 8 made from a soft material such as polyurethane foam is provided at the top of the first space 7, and sweat-absorbing pads 9, comprising polyurethane foam pads covered with cloth, are provided on both sides.

The liner 6, the top pad 8 and the sweat-absorbing pads 9 are interior elements of the helmet. The sweat-absorbing pads 9 are not provided at front and rear portions of the helmet, as shown in Figure 4. The liner 6 has a second space 10 and a third space 11, both of which communicate with the first space 7 and are lined with mesh type cloths 9a and 9b. The second space 10 and the third space 11 are positioned outwardly of the head outline H, as shown in Figures 2 and 4, and can receive respectively the user's front hair and rear hair.

In the connecting portion between the first space 7 and the second space 10, there are provided a first step portion 12 in the roof of the liner 6, and second and third step portions 13,14 at the sides. At both sides of the connection portion between the first space 7 and the third space 11 there are also provided a fourth step portion 15 and a fifth step portion 16. Each of the step portions 12 to 16, and the sweat-absorbing pads 9, are located adjacent the head outline H. As shown in Figure 4, the second and third step portions 13 and 14 have straight line portions and form deep steps.

The thickness of the liner 6 is greatest at the first step 12, so as to make the space 10 larger. Further, the space 10 between the liner 6 and the head outline H is widest at its lowest portion, resulting in easy access of fresh air from the atmosphere to the space 10. The fourth and fifth step portions 15 and 16 are formed as comparatively shallow steps with continuous curves, the tangential lines T of which converge rearwardly towards the center line C.

The width A between the second and third steps 13 and 14 and the width B between the fourth and fifth steps 15 and 16 are such that $A \geqq B$ (A is larger than or equal to B). Further, the ratio A/W between the width A and the maximum internal width W of the liner 6 is about (100 to 120)/179. Dimensions in these ratios provide for both good stability of the helmet on the head, and for the prevention of disheveled hair.

Air flow grooves 17 and 18 are provided in the surface of the liner 6, between the second and third spaces 10 and 11. The grooves 17 and 18 have rearwardly expanding tapered shapes, as shown in Figure 4, and the deepest portions thereof are located adjacent the first step 12, as shown particu-

larly in Figure 5. The air flow grooves 17 and 18 permit fresh air from the atmosphere to be effectively conducted rearwardly, with a notable cooling effect. Further, as the third space 11, communicating with the air flow grooves 17 and 18, is located in the rear portion of the shell, vacuum pressure is readily generated therein to promote the flow of air along the grooves.

It would be possible to provide a third space 11 in both sides of the rear portion of the shell, with the air flow grooves 17 and 18 connected to this third space.

The cloth lining 9b provided in the third space 11 provides for good ventilation of the air flow grooves 17 and 18, and is thus effective to prevent the head from overheating. Seam portion 9c is provided at the connection between each of the cloths 9a and 9b and the sweat-absorbing pad 9, in the first space 7, and is arranged so that it is level with the adjoining step. This makes the second and third spaces 10 and 11 as wide as possible. The seam portion 9c can be formed as shown in full lines in Figure 6 so that its tip projects only slightly over the fourth or fifth step 15 or 16, or it can be formed as shown in ghost lines in Figure 6 so that the tip extends along the step, which gives a softer feel to the liner edge portion. Sponge material 9d can be provided between the cloth 9b and the liner 6 as shown in Figure 7, and can then prevent changes in the cloth. These arrangements employed in the helmet rear portion as to the location and construction of seam portion 9c and the provision of sponge material underlying the cloth 9b can also be adapted for use at the front portion.

Further details of the liner 6 are illustrated in Figure 5. L_1 and L_2 in the drawing show lines formed at the sides by the steps 13 and 15, which are inclined outwardly with respect to vertical lines V_1 and V_2. This helps to establish the stable support of the helmet. However, a construction as indicated by the dotted lines L_3 and L_4, which are inclined inwardly with respect to the vertical lines V_1 and V_2, can make for less disheveled hair when wearing the helmet.

In the relevant Japan Industrial Standard (JIS) the "basic plane" is a plane connecting the bottom extremities of an ear and an eye and the "reference plane" is a plane passing through a specific point and parallel to the basic plane. In Figure 5 the basic plane is shown at S_1 and the reference plane is shown at S_2. The relationship between the height h_1 from the reference plane S_2 to the first step, and the height h_2 from the reference plane S_2 to the highest point of the line L_2, should be $h_1 > h_2$, whereby the top points of the fourth and fifth steps 15 and 16 are lower than the first step 12.

The rear end portion of the liner 6 is curved outwardly and the inner and outer curve changing points P_1, P_2 are located higher than the basic plane S_1. The curve changing point P_1 is closer to the reference plane S_2 than is the curve changing point P_2. This construction results in the liner 6 being comparatively thinner, whereby provided a large enough third space 11 without enlargement of the outer dimensions of the liner.

In use, when the above described helmet is worn on a head H, the head H is received in the first space 7 and the front hair H_f and the rear hair H_r are received respectively in the second space 10 and the third space 11. Thus the hair has less contact with the liner 6 and is consequently less compressed. Further, as the first space 7, the second space 10 and the third space 11 all communicate with each other by way of the air flow grooves 17 and 18, there is good ventilation and less overheating of the head. The top of the head touches the pad 8, the first step 12 and the sweat-absorbing pad 9. The front portion of the head touches the second and third steps 13 and 14, while the rear portion of the head touches the fourth and fifth steps 15 and 16. Therefore, if the head moves in any direction, such as forward or rearward, the helmet is still supported in a stable fashion.

In an alternative construction, all of the steps 12 to 16 can be formed in an inner fitted pad.

Figure 8 of the drawings illustrates the manner in which air will flow through the helmet in use, by way of the arrows. Air enters at arrow A and flows rearwardly in the direction of arrow B. Some of the air then flows out of the rear of the helmet as indicated by arrows C, while some flows out of the sides as shown by arrows D. The vacuum generating portion of the helmet interior is from plane E rearwardly, as indicated by arrow F.

It will thus be seen that the present invention, at least in its preferred forms, provides space inside an interior element of a helmet, around the front portion of a user's head, and thus applies less pressure to the front hair and good ventilation inside the helmet, resulting in a less overheated head and less disheveled hair while the helmet is being worn. Furthermore the hair is less disheveled by the action of putting on the helmet.

Claims

1. A safety helmet having a shell (1) and an internal structure (6) therein, wherein the said internal structure is formed to define a front space (10) to accommodate the user's front hair, and a rear space (11) to accommodate the back of a user's head, both of which spaces are open to the atmosphere, and an air flow path (17,18) in said internal structure ex-

tending from the said front space to the said rear space, characterised in that the width of the said front space is greater than the width of the said air flow path.

2. A helmet according to claim 1, wherein a space (7) defined by the said internal structure to receive a user's head is wider than the said front space (10).

3. A helmet according to claim 1 or 2, wherein the said air flow path comprises at least one groove (17,18) formed in a liner (6) of said internal structure.

4. A helmet according to claim 3, wherein two of said grooves (17,18) are provided at right and left sides respectively of the helmet.

5. A helmet according to claim 3 or 4, wherein the or each groove (17,18) has its deepest portion adjacent the top of the said front space (10).

6. A helmet according to any of claims 3 to 5, wherein the or each groove (17,18) opens to the atmosphere in the said rear space (11) where the width of the helmet is narrow.

7. A helmet according to any preceding claim, wherein a mesh type cloth (9a) defines the front wall of said front space (10).

8. A helmet according to any preceding claim, wherein the line L_1 is inclined forwardly relative to the vertical line V_1 where L_1 is the line formed by a step portion (13,14) formed in a side connection portion between the front space (10) and a space (7) for receiving the user's head and V_1 is the line extending from the beginning of the L_1 less remote from the top of the helmet and perpendicular to the plane connecting the bottom extremities of an ear and an eye.

9. A helmet according to any preceding claim, wherein a pad extends beyond the edge of a liner of said internal structure.

10. A helmet according to any preceding claim wherein the ratio A/W is approximately (100 to 120)/179 where A is the width between two step portions (13,14) formed in side connecting portions between the front space (10) and a space (7) for receiving the user's head and W is the maximum internal width of the internal structure (6).

11. A helmet according to any preceding claim, wherein a step (12) of substantial depth is formed above the said front space (10), in a liner (6) of the said internal structure.

12. A helmet according to claim 11, wherein the depth of the said front space (10) is least in the region of the said step.

Revendications

1. Casque de protection comprenait une coquille (1) et une structure interne (6) à l'intérieur de celle-ci, dans lequel ladite structure interne est façonnée de manière à définir un espace frontal (10) destiné recevoir les cheveux frontaux de l'utilisateur, et un espace arrière (11) destiné à recevoir l'arrière de la tête de l'utilisateur, les deux espaces étant ouverts sur l'atmosphère, et un chemin (17, 18) d'écoulement d'air réalisé dans ladite structure interne, s'étendant du dit espace frontal jusqu'au dit espace arrière,
caractérisé en ce que la largeur du dit espace frontal est supérieure à la largeur du dit chemin d'écoulement d'air.

2. Casque selon la revendication 1, dans lequel un espace (7) défini par ladite structure interne destiné à recevoir la tête d'un utilisateur est plus large que ledit espace frontal (10).

3. Casque selon la revendication 1 ou 2, dans lequel ledit chemin d'écoulement d'air comprend au soins une rainure (17, 18) façonnée dans une garniture (6) de ladite structure interne.

4. Casque selon la revendication 3, dans lequel deux des dites rainures (17, 18) sont prévues respectivement sur les côtés droit et gauche du casque.

5. Casque selon la revendication 3 ou 4, dans lequel la partie la plus profonde de la rainure, voire de chaque rainure (17, 18) est adjacente au sommet du dit espace frontal (10).

6. Casque selon l'une quelconque des revendications 3 à 5, dans lequel la rainure, voire chaque rainure (17, 18) s'ouvre vers l'atmosphère au niveau du dit espace arrière (11), là où la largeur du casque est faible.

7. Casque selon l'une quelconque des revendications précédentes, dans lequel un tissu maillé (9a) définit la paroi avant du dit espace frontal (10).

8. Casque selon l'une quelconque des revendications précédentes, dans lequel la ligne L_1 est inclinée vers l'avant par rapport à la ligne verticale V_1, où L_1 est la ligne formée par un gradin (13, 14) façonné dans une partie latérale de liaison comprise entre l'espace frontal (10) et un espace (7) pour recevoir la tête de l'utilisateur, et où V_1 est la ligne s'étendant depuis l'origine de L_1 la moins éloignée du sommet du casque, et perpendiculaire au plan qui relie les extrémités inférieures d'une oreille et d'un oeil.

9. Casque selon l'une quelconque des revendications précédentes, dans lequel un coussin s'étend au-delà du bord d'une garniture de ladite structure interne.

10. Casque selon l'une quelconque des revendications précédentes, dans lequel le rapport A/W est approximativement (100 à 120)/179, où A est la largeur entre deux gradins (13, 14) façonnés dans les parties latérales de liaison entre l'espace frontal (10) et un espace (7) destiné à recevoir la tête de l'utilisateur, et où W est la largeur intérieure maximale de la structure interne (6).

11. Casque selon l'une quelconque des revendications précédentes, où un gradin (12) de profondeur substantielle est façonné au-dessus du dit espace frontal (10), dans une garniture (6) de ladite structure interne.

12. Casque selon la revendication 11, dans lequel la profondeur du dit espace frontal (10) est la plus faible au niveau du dit gradin.

Patentansprüche

1. Schutzhelm mit einer Schale (1) und einem darin befindlichen inneren Aufbau (6), der so ausgebildet ist, daß eine vordere Mulde (10) zur Aufnahme der vorderen Haarpartie des Trägers und eine hintere Mulde (11) zur Aufnahme des Hinterkopfes des Trägers festgelegt wird,

   wobei beide Mulden zur Außenumgebung hin offen sind und ein Durchgang für eine Luftströmung (17,18) in dem inneren Aufbau (6) von der vorderen Mulde zu der hinteren Mulde hin verläuft,

   dadurch gekennzeichnet,

   daß die Breite der vorderen Mulde größer ist als die Breite des Durchgangs für die Luftströmung.

2. Helm nach Anspruch 1,

   wobei eine in dem inneren Aufbau festgelegte Mulde (7) zur Aufnahme des Kopfes eines Trägers größer ist als die vordere Mulde (10).

3. Helm nach Anspruch 1 oder 2,
   wobei der Durchgang für eine Luftströmung mindestens eine in einer Zwischenlage (6) des inneren Aufbaus ausgebildete Nut (17,18) umfaßt.

4. Helm nach Anspruch 3,
   wobei zwei der Nuten (17,18) auf der linken beziehungsweise rechten Seite des Helms vorgesehen sind.

5. Helm nach Anspruch 3 oder 4,
   wobei die oder jede Nut (17,18) ihren tiefsten Abschnitt nahe dem oberen Ende der vorderen Mulde (10) aufweist.

6. Helm nach einem der Ansprüche 3 bis 5,
   wobei die oder jede Nut (17,18) sich zur Umgebung in der hinteren Mulde (11) öffnet, wo die Helmbreite klein oder verringert ist.

7. Helm nach einem der vorhergehenden Ansprüche,
   wobei ein maschenartiger Stoff (9a) die vordere Wand der vorderen Mulde (10) festlegt.

8. Helm nach einem der vorhergehenden Ansprüche,
   wobei die Linie L_1 bezüglich der vertikalen Linie V_1 nach vorne geneigt ist,

   wobei L_1 die von einem Stufenabschnitt (13,14) gebildete Linie ist, der in einem seitlichen Verbindungsabschnitt zwischen der vorderen Mulde (10) und der Mulde (7) zur Aufnahme des Kopfes des Trägers geformt ist, und V_1 diejenige Linie ist, die von dem dem oberen Ende des Helms weniger weit entfernten Anfang von L_1 aus senkrecht zu der die unteren Endpunkte eines Ohrs und eines Auges verbindenden Ebene verläuft.

9. Helm nach einem der vorhergehenden Ansprüche,
   wobei sich ein Polster über die Kante einer Zwischenlage des inneren Aufbaus erstreckt.

10. Helm nach einem der vorhergehenden Ansprüche,
    wobei das Verhältnis A/W etwa (100 bis 120)/-(179) beträgt,

    wobei A die Breite zwischen den zwei in den seitlichen Verbindungsabschnitten zwischen der vorderen Mulde (10) und der Mulde (7) zur Aufnahme des Kopfes des Trägers ge-

formten Stufenabschnitten (13,14) und W die maximale Innenbreite des inneren Aufbaus (6) ist.

11. Helm nach einem der vorhergehenden Ansprüche,
wobei eine Stufe (12) von beträchtlicher Tiefe in einer Zwischenlage (6) des inneren Aufbaus oberhalb der vorderen Mulde (10) ausgebildet ist.

12. Helm nach Anspruch 11,
wobei die Tiefe der vorderen Mulde (10) im Bereich der Stufe am geringsten ist.

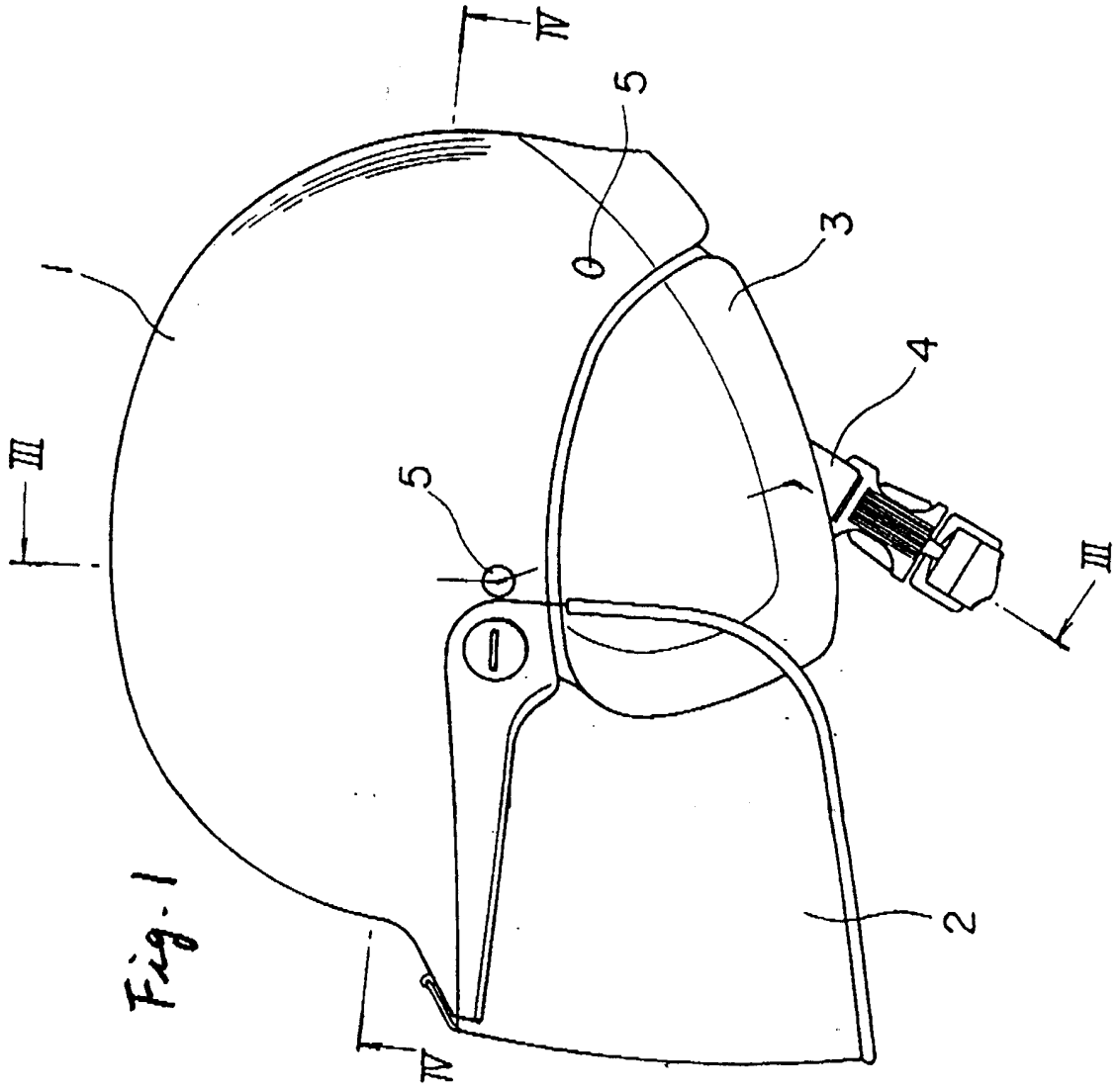


Fig. 1

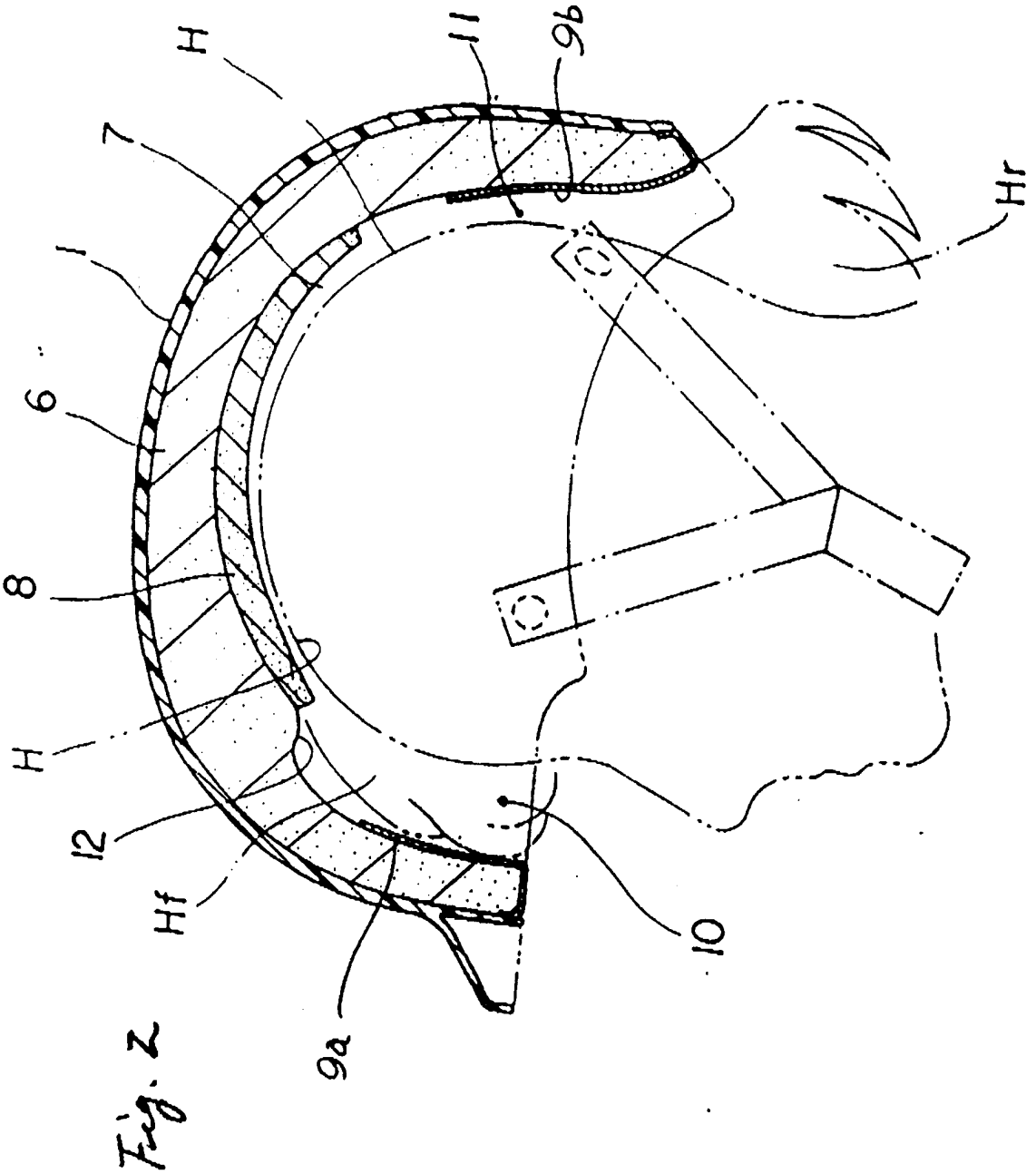


Fig. 2

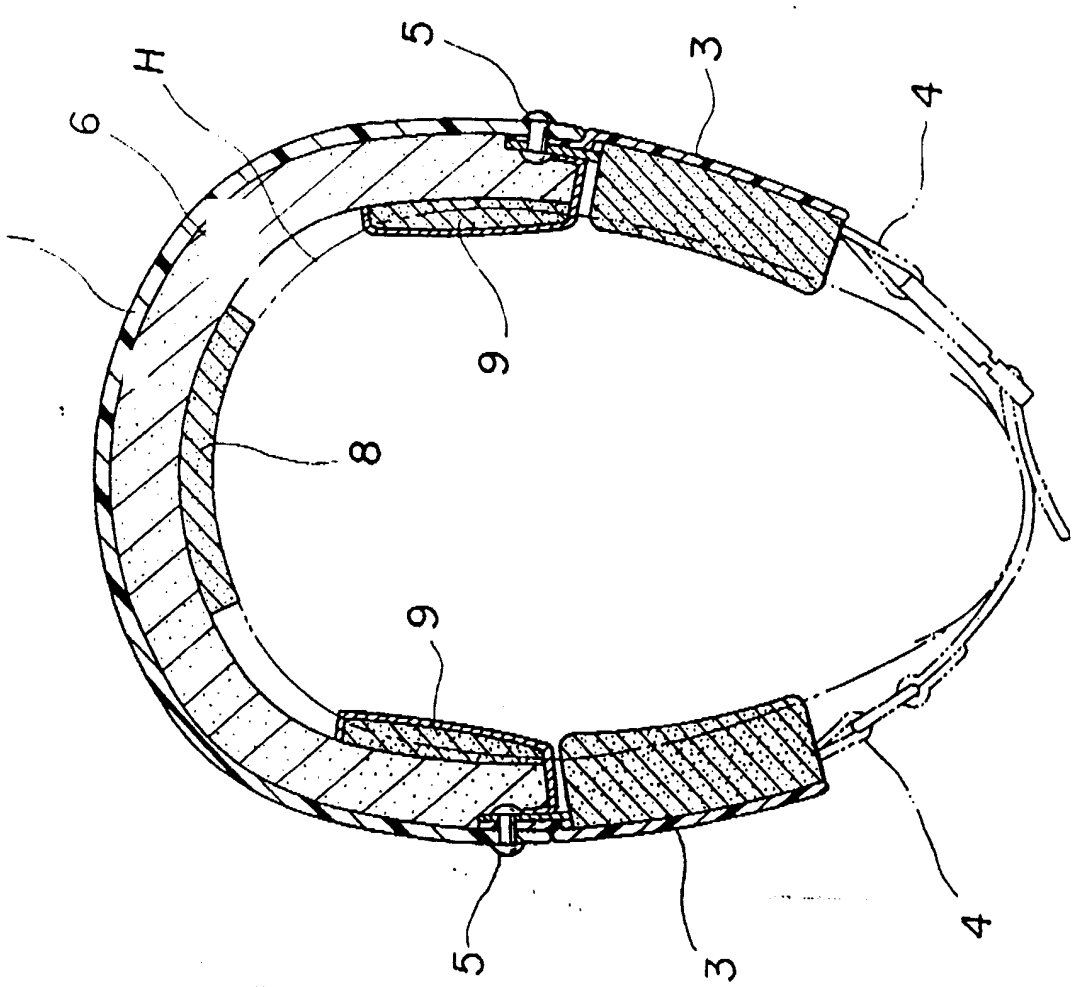


Fig. 3

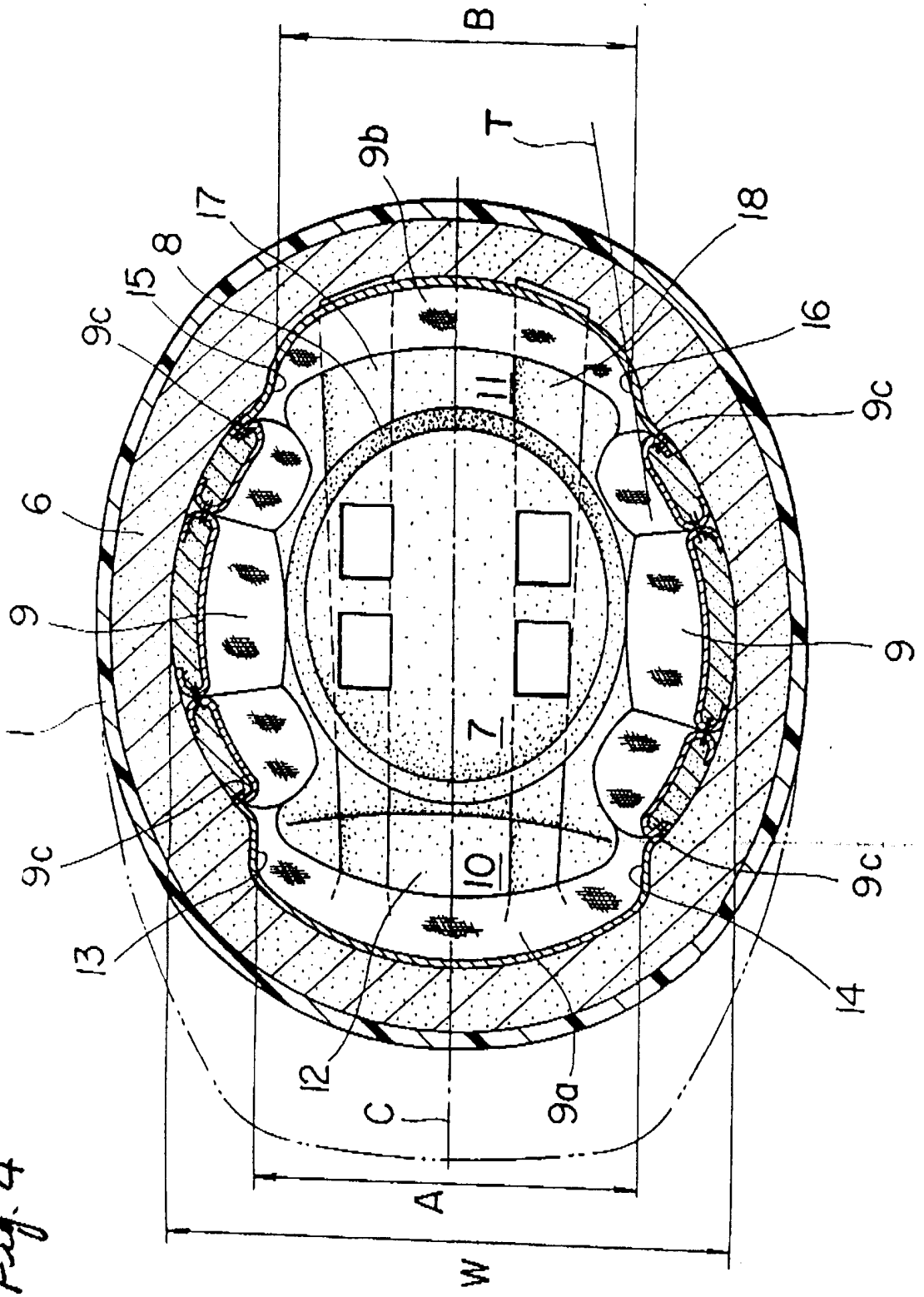


Fig. 4

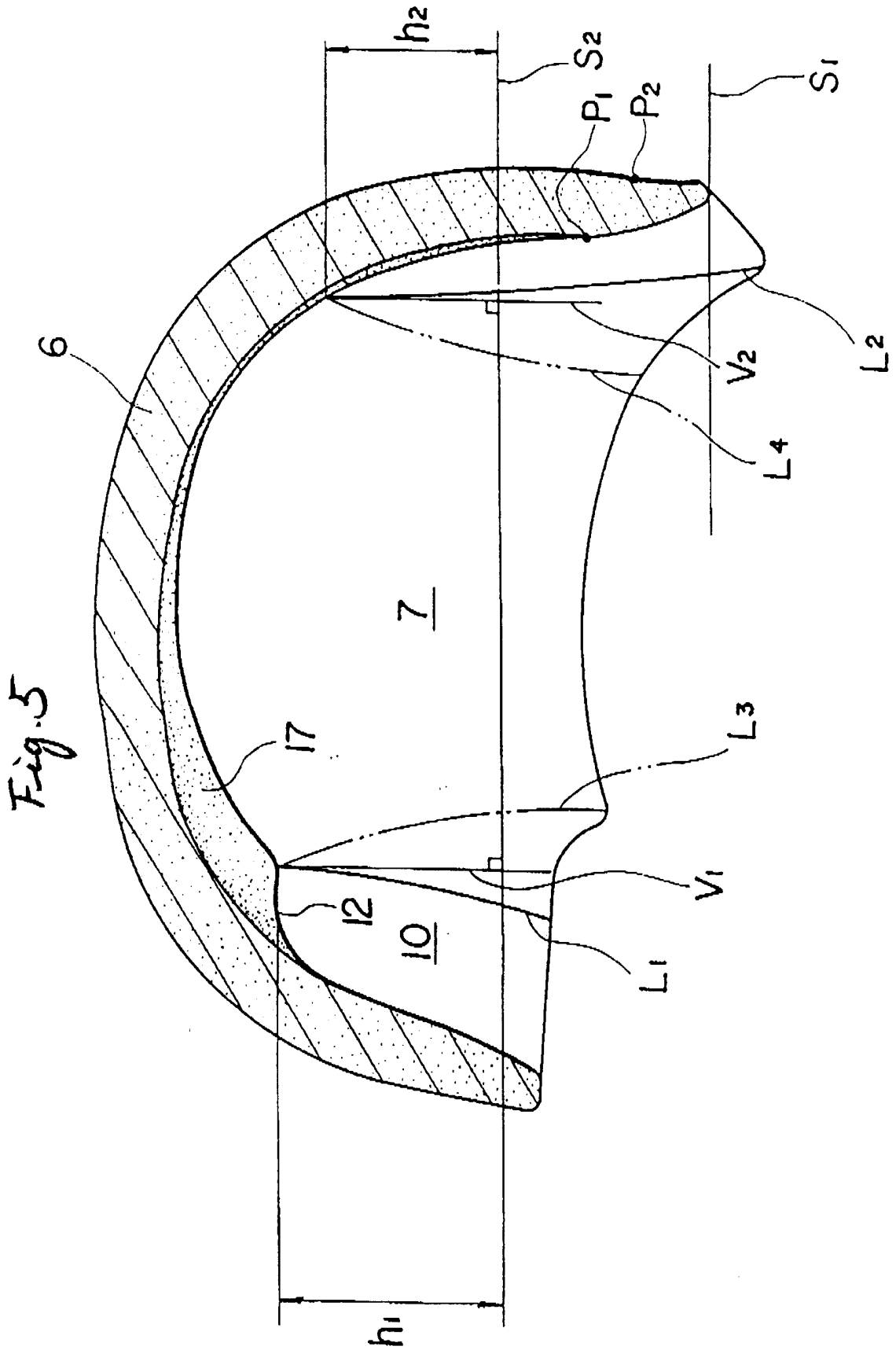


Fig.5

Fig. 6

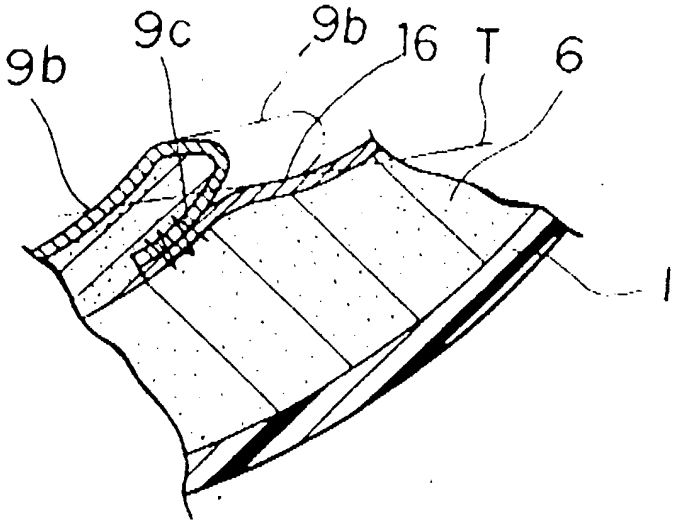
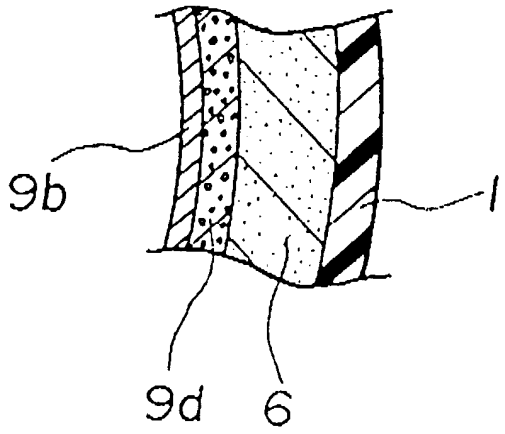


Fig. 7



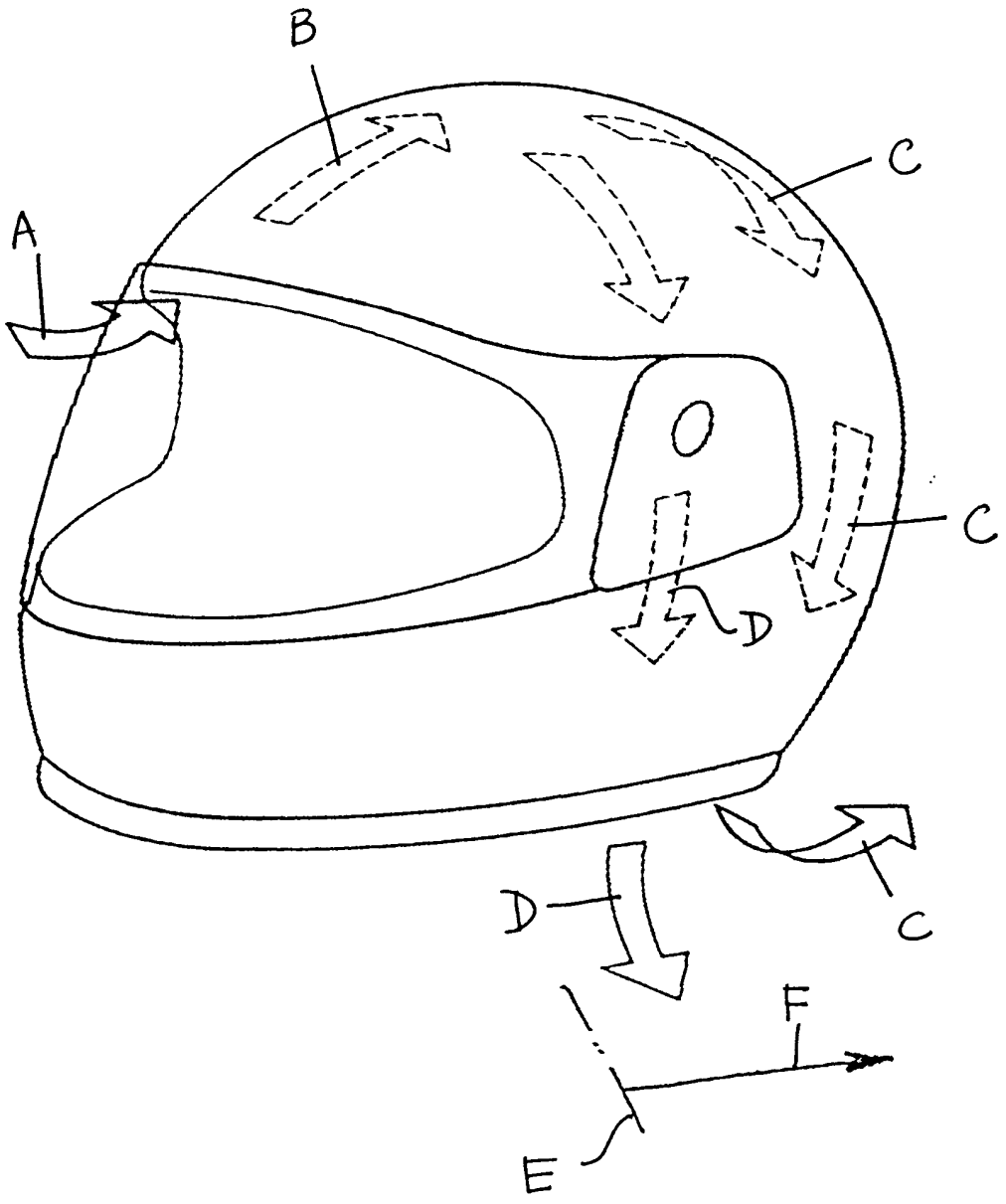


FIG. 8